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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,628	09/05/2003	Yoshihide Senzaki	A-71730/MSS (463035-878)	8131
32940	7590	03/28/2006	EXAMINER	
DORSEY & WHITNEY LLP 555 CALIFORNIA STREET, SUITE 1000 SUITE 1000 SAN FRANCISCO, CA 94104			CHEN, BRET P	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/656,628	<b>Applicant(s)</b> SENZAKI ET AL.	
	<b>Examiner</b> B. Chen	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### **DETAILED ACTION**

Claims 1-20 are pending in this application. Amended claims 1-2, 7-9, 11, 16-17 and newly added claims 18-20 are noted.

The amendment dated 1/3/06 has been entered and carefully considered. The examiner appreciates the amendments to the abstract and the claims. In view of said amendment, the objection to the abstract and the prior art rejection have been withdrawn.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 2, the phrase “has a thickness variation of about 2% 1~ or less” is deemed new matter as there is no support for said phrase in the original specification. The same issue applies to claim 20.

In claim 8, the phrase “an inert gas is introduced ... at a flow rate of about 10 to 10,000 sccm” is deemed new matter.

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In claim 18, the phrase “deposition rate of 500 Angstroms or greater” is deemed new matter.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balsan et al. (US 20020039835).** Balsan discloses a method of depositing a conformal hydrogen-rich silicon nitride layer onto a patterned structure in the manufacture of semiconductor integrated circuits (ICs) (par 1) in which the silicon nitride layer is formed utilizing rapid thermal CVD using a Si precursor based chemistry at a temperature of about 600°C to about 950°C and a pressure of about 50 Torr to about 200 Torr (par 46). The reactor can be a commercially available cold wall single wafer reactor (par 74). However, the reference fails to teach a plurality of heating elements.

It is noted that Balsan specifically teaches that the substrate is heated. One skilled in the art would conclude that at least one heating element is utilized. Claim 1 differs from Balsan in reciting that there are a plurality of heating elements while Balsan discloses at least one heating element. It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

In addition, it is noted that the reference fails to teach a hot wall reactor specifically with rapid thermal CVD. However, the reference does teach the advantages of using a hot wall

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reactor (par 30). It would have been obvious to utilize a hot wall reactor with the expectation of obtaining the known benefits.

In claims 2-10, the applicant requires different thickness variations, precursors, pressure and flow rates. These deposition parameters are often varied to maximize the desired properties of the final product. For example, one skilled in the art would realize that if high throughput is desired, then certain precursors at specific flow rates and pressures would be utilized. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as thickness variations, precursors, pressure and flow rates through routine experimentation in the absence of a showing of criticality.

In claim independent 11, the applicant requires positioning the wafer. This limitation is taught above.

In independent claim 17, the applicant requires a specific precursor. This limitation has been addressed above.

The limitations of dependent claims 12-16 and 18-20 have been addressed above.

**Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hurley et al. (5,939,333).** Hurley discloses a method of forming silicon nitride films to improve the characteristics of semiconductor devices in which a monolayer of silicon is predeposited on the one or more component surfaces of the substrate surface resulting in a substantially native oxide free uniform predeposited silicon substrate surface followed by a silicon nitride (col.2 lines 17-31). The predeposition of the silicon as represented may use a variety of materials including silicon hydrides or silanes such as dichlorosilane (DCS,  $\text{SiH}_2\text{Cl}_2$ ), silane ( $\text{SiH}_4$ ),

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disilane (H.sub.3 SiSiH.sub.3), trichlorosilane (TCS, SiHCl.sub.3) at a temperature in the range of about 500.degree. C. to about 800.degree. C. and at a pressure in the range of about 50 mTorr to about 500 mTorr (col.7 lines 20-44). A single wafer reactor (col.9 lines 32-40) and hot wall reactors (col.4 lines 46-67) can be utilized. However, the reference fails to teach a plurality of heating elements.

It is noted that Hurley specifically teaches that the substrate is heated. One skilled in the art would conclude that at least one heating element is utilized. Claim 1 differs from Hurley in reciting that there are a plurality of heating elements while Hurley discloses at least one heating element. It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

In addition, it is noted that the reference fails to teach the appropriate deposition rate. It is noted that the reference clearly teaches that the deposition rate will vary depending upon various conditions of the deposition as is well known to one skilled in the art (col.4 lines 20-22). One skilled in the art knows that different precursors, pressure and flow rates produce different deposition rates. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as thickness variations, precursors, pressure and flow rates through routine experimentation to obtain a specific flow rate in the absence of a showing of criticality.

The limitations of dependent claims 2-20 have been addressed above.

***Response to Arguments***

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. Chen whose telephone number is (571) 272-1417. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Bc  
3/20/06

A handwritten signature in black ink, appearing to read 'B. Chen', with a stylized flourish at the end.

BRET CHEN  
PRIMARY EXAMINER